DAILY OPERATIONS BEAT DEVELOPMENT ACTIVITIES TOWARDS SUPPLY CHAIN RESILIENCE

Dansk resumé

Denne artikel præsenterer resultaterne fra en undersøgelse om forsyningskædens modstandsdygtighed. Modstandsdygtighed kan defineres som evnen til at overleve, tilpasse sig og vokse i lyset af turbulente tider og forandringer.

Undersøgelsens resultater, som er baseret på 174 respondenter fra 155 produktionsvirksomheder samt 19 logistik- og transportvirksomheder, afslører i hvilken grad virksomhedernes forsyningskæder påvirkes af COVID-19, og især i hvilken grad virksomheder arbejder på at øge robustheden i deres forsyningskæder.

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1. Introduction

As a consequence of the disruptions caused by the COVID-19 pandemic, supply chain management, and especially supply chain resilience (SCR), has gained ever increased attention, both from practitioners and from academics (Stentoft & Mikkelsen, 2020). A survey by Gartner (2021) points to cost and resilience as the top two priorities that top management demands supply chain directors to focus on.

However, not only major disruptions such as the current worldwide pandemic may cause problems for supply chains. Other events such as flooding, earthquakes, cyberattacks, and tsunamis may also have severe impacts on supply chains (Akkermans & van Wassenhove, 2018; Wedawatta & Ingirige, 2012; Nguyen et al., 2021). Other events with a negative impact on supply chains may be trade wars and regional instability (Akkermans & Wassenhove, 2018; Pettit et al., 2010; Ponomarov & Holcomb, 2009) or the blocking of the Suez Canal, as we have seen lately. In the wake of the COVID-19 pandemic, the business environment is currently characterized by shortages of materials such as electronics, iron, steel, aluminum, plastic, and wood.

According to Pettit et al. (2010), factors such as globalization of supply chains through supplier base and increased outsourcing and offshoring to low-cost countries followed by long lead times, centralized distribution, reductions in company supplier base, and increasing demand volatility all contribute to increasing the vulnerability and supply chain risks for companies, and hence potential disruptions. Companies' turnover and supply are impacted by these disruptions. Ban on gatherings have punctured the earning basis for some companies, and absent supply from Asia has led to an increased level of panic buys.

Resilience can be defined as "the ability to survive, adapt, and grow in the face of turbulent change" (Pettit et al., 2013, p. 46). Thus, resilience is concerned with the organization or system's ability to return to a normal or better state after the event/disruption (Christopher & Peck, 2004; Pereira et al., 2014). The purpose of this article is to present the main results of a questionnaire survey conducted in the spring of 2021 among manufacturers and logistics and transport companies in The Region of Southern Denmark (Stentoft & Mikkelsen, 2021a).

FACT BOX ABOUT THE SURVEY

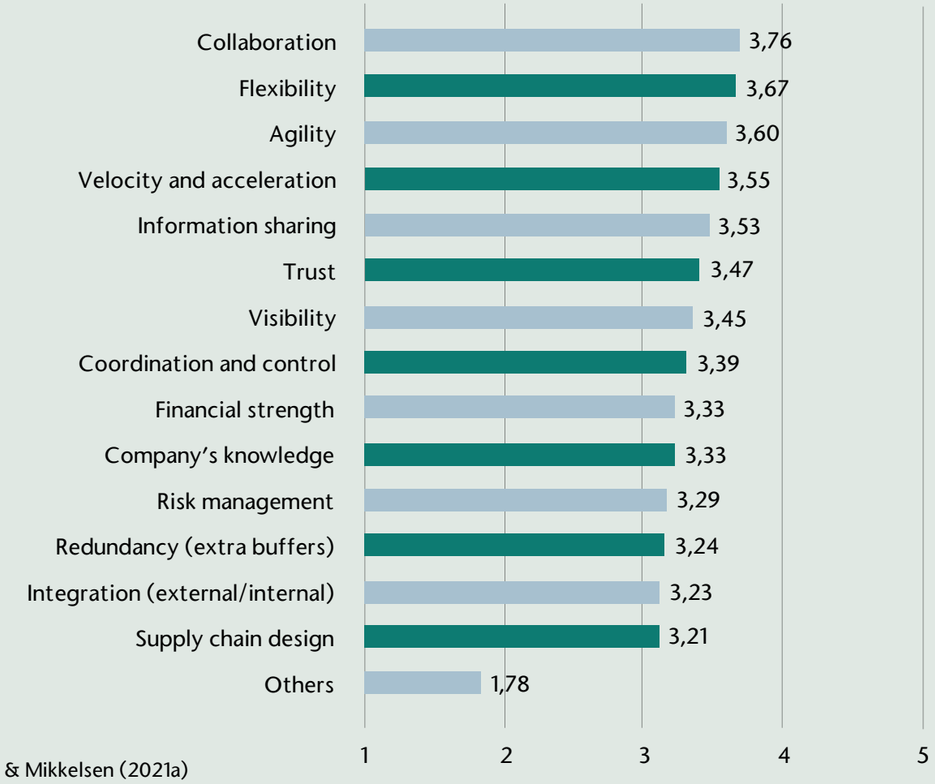
Based on 174 respondents from 155 manufacturing companies and 19 logistics and transport companies, the aim of the survey is to reveal to what degree the companies' supply chains are impacted by COVID-19, and especially to what degree companies are working on enhancing robustness in their supply chains. The focus is on companies in The Region of Southern Denmark to match the scope of the funding organization of the survey.

All questions are answered on a five-point Likert scale (1 = from a very low degree: 5 = to a very high degree). In all, 568 companies were identified from the company database Bisnode. In all, 189 accepted to participate in the survey of which 174 respondents delivered full answers to all questions. Thus, the response rate is 30,6% out of the 568 contacted companies. Of the 174 responding companies, 123 are small and medium enterprises (SME) while 51 are large companies exceeding 250 employees.

2. Factors promoting supply chain resilience

The respondents have been asked to evaluate a predefined list of enabling factors for creating supply chain resilience (Pereira et al., 2014).

FIGURE 1. Enablers for supply chain resilience



Source: Stentoft & Mikkelsen (2021a)

Figure 1 reveals that factors such as *collaboration* (average at 3,76), *flexibility* (average at 3,67), *agility* (average at 3,60) and *velocity and acceleration* (average at 3,55) obtain the highest averages and are thus in general found to be the most influential factors in enabling the creation of supply chain resilience. Although *supply chain design* to some degree is found to be an enabler for supply chain resilience, it is interesting to see that this factor obtains the lowest average (3,21). *Supply chain design* is a wide concept covering activities with, for example, having the right supplier portfolio and its global footprint, determining safety stock levels, and location of inventories.

The results indicate that *supply chain design* in this context is a reactive instead of a proactive practice. Data indicate that *collaboration*, for example, is used more proactively to create a resilient supply chain, whereas *supply chain design* is an activity that takes place after disruptions have occurred. Examples of such practices are the search for local suppliers and alternative materials, increasing minimum stock levels, and search for alternative forms of distribution.

3. Barriers for supply chain resilience

The respondents have been asked to evaluate what they see as barriers and challenges to create and improve supply chain resilience. As shown in Figure 2, the classical barrier *lack of time /too much focus on operational tasks* is a notable obstacle in becoming resilient and obtains an average of 3,60. In our many surveys at the Department of Entrepreneurship and Relationship Management at SDU in Kolding, we constantly see that an utmost barrier often is the dilemma between operational- and development -oriented tasks regardless of the topic investigated.

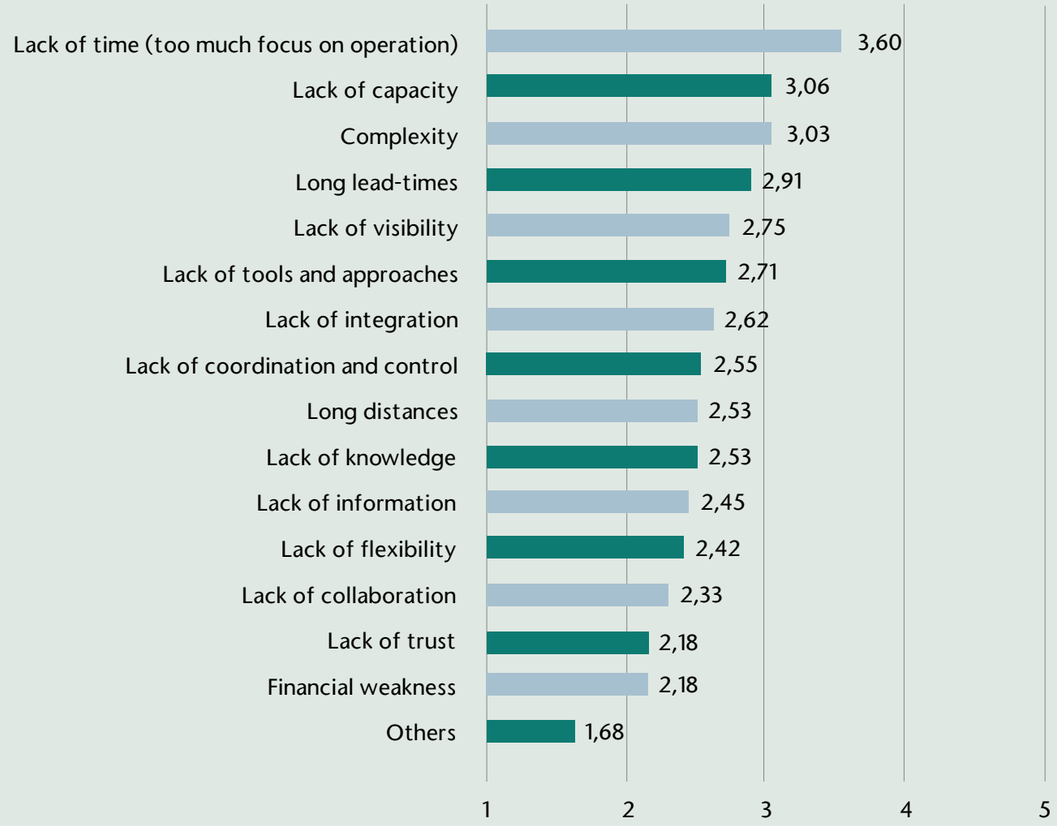
In an earlier survey among the members of the Danish Supply Chain Panel about procurement risk management (Stentoft & Mikkelsen, 2021b), the respondents were asked to assess to what degree they operate with readiness plans for recovery after a potential disruption. Data reveal a practice with an average of 3,05 (to some degree) but 3,50 for its relevance. Stentoft & Mikkelsen (2021b) found that companies, before the COVID-19 pandemic, were occupied with day-to-day operations and getting things done, and thus there was an absence of risk management on the 'strategic agenda'. It seems like the old saying "If it ain't broke, don't fix it" is still going strong!

Other barriers in Figure 2 are the supply chain related barriers *lack of capacity* (with an average of 3,06) and *complexity* (with an average of 3,03). *Long lead-times* (with an average of 2,91), *lack of transparency* (with an average of 2,75), and other potential barriers and challenges that seem not so prevalent. *Lack of time* and *lack of capacity* indicate a focus on daily business and operations. This is perhaps not surprising, as many companies have been very much occupied with acquiring materials, components, and goods to make fast expeditions to customers to ensure survival. In contrast, the companies only to a low degree perceive *lack of trust* and *financial weakness* as barriers (both with an average of 2,18).

4. Learning

The respondents have also been asked questions on their ability to recognize the value of new

FIGURE 2. Barriers for supply chain resilience



Source: Stentoft & Mikkelsen (2021a)

information, assimilate it, transform it, and exploit it – a term that has been labeled 'absorptive capacity'. Zahra & George (2002) have extended the seminal work by Cohen & Levinthal (1990) and operationalize absorptive capacity to the following four stages (see Figure 3):

1. Acquisition: The capability to identify and acquire externally generated knowledge, which is critical to its operations

2. Assimilation: Routines and processes allowing the company to analyze, process, interpret, and understand the information obtained from external sources

3. Transformation: The capability to develop and refine the routines that facilitate that existing knowledge is combined with newly acquired and assimilated knowledge

4. Exploitation: Use, implementation

Based on the work by Flatten et al. (2011), we have asked questions about their practice in *acquiring* new knowledge:

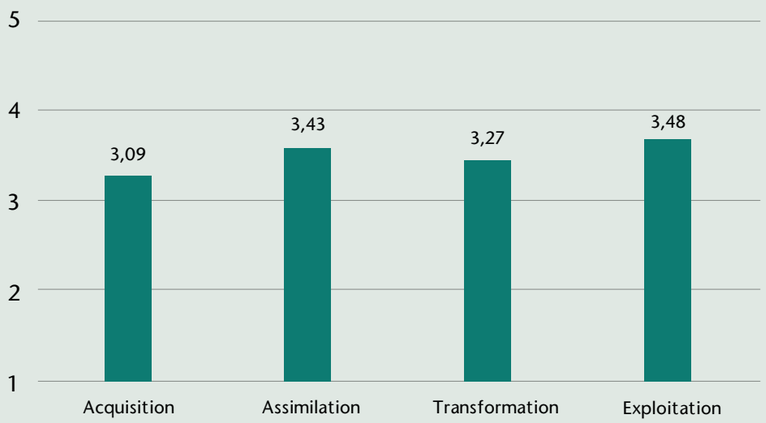
- The search for relevant information concerning our industry is the everyday business in our company.
- Our management motivates the employees to use information sources within our industry.
- Our management expects that the employees deal with information beyond our industry.

As shown in Figure 3, the respondents do, to some degree, acquire knowledge externally with an overall average of 3,09. They search for relevant information in their industries with an average of 3,32; the management teams motivate the employees to use information sources within their respective industries with an average of 3,19 where a search for new knowledge in other industries only obtains an average of 2,75.

The overall average for *assimilation* is 3,43 (see Figure 3), which comprise of four questions:

- In our company, ideas and concepts are communicated cross-departmental.
- Our management emphasizes cross-departmental support to solve problems.
- In our company, there is a quick information flow, e.g., if a business unit obtains important information, it communicates this information promptly to all other business units or departments.

FIGURE 3. Learning



Source: Stentoft & Mikkelsen (2021a)

- Our management demands periodical cross-departmental meetings to interchange new developments, problems, and achievements.

Silo mentality is a well-known devil in many companies, why it is interesting to analyze how the companies communicate internally regarding the acquired knowledge. The data behind Figure 3 reveal that the respondents to a high degree find that they operate with a fast communication flow of important and relevant information internally between departments (with an average of 4,03). In contrast, it seems to be more challenging when the companies are communicating ideas and concepts across departments (with an average of 2,75). These two extremes seem to be a paradox.

One plausible explanation can be that information is more a question about processed data which relatively easily can be formulated and transferred by, for example, email. In contrast, ideas and concepts are more often diffuse and complex to disseminate and require deeper explanation and another form of handover, e.g., through the physical meeting. The respondents report that they are encouraged to emphasize cross-departmental meetings to exchange new initiatives, problems, and performance even though the average is lower (3,57); however, still significant. This practice can affect the exchange of ideas and concepts across departments.

A similar line of reasoning can be made regarding the management's emphasis on cross-functional support in problem-solving (with an average of 3,38). If this is not encouraged by the management team, why then operate with cross-functional meetings? Thus, the heavier part of knowledge exchange requires a more active effort than just communicating information.

The overall average for the four questions concerning *transformation,* as listed below, is 3,27 (see Figure 3).

FACT BOX: SUPPLY CHAIN RESILIENCE PROJECT FUNDED BY THE DANISH INDUSTRY FOUNDATION

The Danish Industry Foundation has funded a two-year research project focusing on supply chain resilience in small- and medium-sized Danish manufacturing enterprises (see www.scr-smv.dk). The project is a collaboration project between SDU, CBS, and the University of Bremen. The purpose is to identify and address the target group vulnerabilities to build a significantly better supply chain resilience. 20 companies will be involved, in two phases, to develop tools and approaches to enhance supply chain resilience.

Stay updated by signing up for the projects' newsletter at https://scr-smv.dk/nyhedsmail/. The first 10 companies that have agreed to attend the project in the first phase are:

- Plus Pack
- Ellepot
- Logitrans
- Alpha Elektronik
- KVM Conheat
- SBS Friction
- Vikan
- Tonica Elektronik
- Vitrolife
- Farmdroid

The project is staffed with the following resources: Professor (wsr) Kim Sundtoft Hald, CBS, Professor Aseem Kinra, University Bremen, Germany, Associate Professor Ole Stegmann Mikkelsen, SDU, Communication Consultant Tina Højrup Kjær, SDU, and Professor, Project Manager Jan Stentoft, SDU.

- Our employees have the ability to structure and to use collected knowledge.
- Our employees are used to absorb new knowledge as well as to prepare it for further purposes and to make it available.
- Our employees successfully link existing knowledge with new insights.
- Our employees are able to apply new knowledge in their practical work.

The averages of the four questions concerning transformation are a little above 3; hence, they apply the collected knowledge to some degree. The employees are to some degree able to apply the new knowledge in their practical work (with an average of 3,38) and bring this knowledge into play to help the company in the best way (an average of 3,31). Similarly, the employees are to some degree capable of connecting new insights with existing knowledge (average of 3,28). The employees' practice to acquire new knowledge, improve this, and make it available in the organization obtains the lowest average of 3,10.

Finally, three questions have been used to operationalize *exploitation,* reaching an overall average of 3,48 (see Figure 3):

- Our management supports the development of prototypes.
- Our company regularly reconsiders technologies and adapts them accordant to new knowledge.
- Our company has the ability to work more effectively by adopting new technologies.

With an average of 3,52, the respondents answer that they are capable of adjusting their knowledge to e.g., new technologies to improve the company. Support from top management is a prerequisite to making progress. This is also the case for adopting new knowledge and developing new products. With an average of 3,52, the respondents perceive that they have support from top management in developing new prototypes. Regarding perceptions of whether the companies work more efficiently after applying new technologies, the average score is 3,40.

5. Conclusion

This article has set out to analyze the enablers and barriers as well as learning elements of supply chain resilience practices among manufacturers and logistics and transport companies in The Region of Southern Denmark. Data reveals that factors as *collaboration, flexibility, agility,* and *velocity and acceleration* obtain the highest averages and are thus in general found to be the most influential to create supply chain resilience. Regarding barriers, the survey data indicate that *lack of time/too much operational focus* is the highest scoring barrier. In the current situation with a shortage of different types of materials, components, and finished goods, we understand that much work is focused on the operation.

However, we will recommend companies to reflect on their practices to assure learning to build resilience for the future (Stentoft et al., 2021). The companies do to some degree acquire, assimilate, transform and exploit new knowledge to create a higher level of supply chain resilience.

However, the companies seem to be better to share the knowledge developed internally compared with external partners. The results indicate improvement areas to work more structured with new knowledge and the transformation of this to concrete tools in the companies. The high level of operation at the expense of development may trip up this process. Therefore, we can recommend that companies organize them in professional experience networks with a focus on supply chain resilience./

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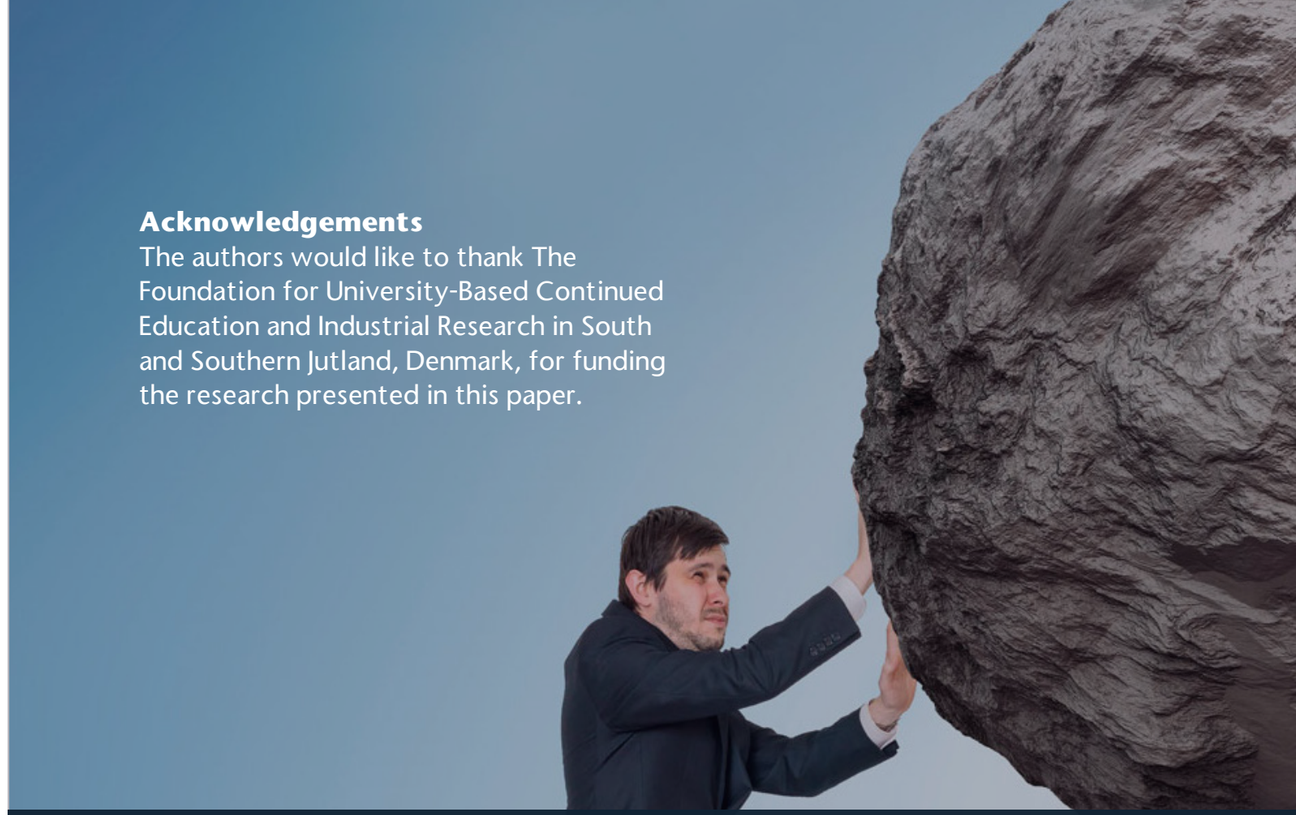

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